MODIS Team Meeting Minutes

Minutes of the MODIS Team Meeting held on Tuesday September 27, 1994.

Action Items:

93. Review the Instrument Flight Operations Understanding of 8/26/93. Provide comments by 9/30/94. Assigned to Roberto 8/ 8/94 CLOSED 10/ 3/94

94. Provide a detailed (high fidelity) analysis of scatter in the scan cavity. The results would determine the need for PF near field scatter measurements vs scan angle. Assigned to Guenther 8/23/94 Preliminary results due 10/15/94. Final due 2/28/95.

95. SBRC & GSFC to team to investigate possible corrections for the spurious response effects in the filters. Assigned to Waluschka 8/23/94. Due 10/25/94

97. Review the SBRC IR&D report on the Indium Bump process and provide comments on acceptability. Assigned to Roberto, Martineau, and Ellis 9/30/94. Due 10/ 4/94

98. Review August schedules and provide a summary of subsystem schedule status. Assigned to Davis, Ferragut, Waluschka, Martineau, Safren, and Daelemans 8/30/94. Due 9/20/94

99. Present a brief (one or two view graph) summary of the instrument status in your subsystem area (based on the QMR). Assigned to Martineau, Waluschka, Davis, Ferragut, Safren/Mocarsky, Gunether/Knight. Due 9/27/94 CLOSED 9/27/94

The following items were distributed:

1) Weekly Status Report #157

2) SBRC Memos submission from week #149

3) Minutes of the previous team meeting

Attendees:

- √ Richard Weber
- √ John Bauernschub
- Rosemary Vail
- √ Lisa Shears
- √ Mike Roberto
- √ Nelson Ferragut
- √ Gene Waluschka
- Bill Barnes
- √ Les Thompson
- √ Bruce Guenther
- √ George Daelemans
- Patricia Weir
- √ Mitch Davis
- √ Ken Anderson
- √ Rick Sabatino
- Cherie Congedo
- Jose Florez
- √ Gerry Godden
- √ Sal Cicchelli
- Larissa Graziani
- √ Bob Martineau
- √ Bob Silva
- √ Robert Kiwak
- √ Harvey Safren
- √ Ed Knight
- √ Harry Montgomery
- Marvin Maxwell
- √ Bill Mocarsky

MODIS Technical Weekly 30 Sep 94

General

I want to take this opportunity to thank Nelson Ferragut for his excellent support of MODIS and to welcome Sal Cicchelli to our MODIS team. Nelson will be staying on for a few weeks to help in the transition and will remain available to help.

The science team meeting will be October 12 through 14 at the Holiday Inn at Route 1 and the Beltway.

The MODIS Performance Verification Plan and Performance Verification Specification (combined CDRLs 022 & 308)

This document has arrived at GSFC. The document number is VJ50-0063-002. Copies should be available in the library. The document provides the following:

1. an overview of the entire MODIS test program, from subassemblies up through instrument, and on to in-orbit tests.

2. Flows requirements for environmental testing to both the MODIS subassembly and instrument levels and describes the verification method for these tests.

3. Flows performance requirements to the instrument level and describes the verification method for these tests.

Several of our technical team members need to review this document to assure there is adequate instrument verification with the replan. The project is requesting this review be completed by October 7.

George Daelemans

1. SBRC continues to test electronics boards for temperature performance.

2. There is an area in the mainframe that is not painted because SBRC is afraid of scratching off the paint. Kapton tape will be used on this area.

3. A 25 degree roll produces less thermal change than the change during an orbit.

Bill Mocarsky and Harvey Safren

1. The whole I&T schedule is success oriented.

2. Duane Bates is replacing Gordon Plews.

3. SBRC needs to have CSTOL procedures written for the EM. This will take about 2 or 3 months.

Gerry Godden

1. Prepared draft of sections for science meeting.

2. Strong recommendation to make measurements of representative portions of aft optics.

3. Has short list of needed drawings for scatter analysis by Breault Research Organization.

Bob Silva

Working on Verification Plan.

Gene Waluschka

1. All EM optical hardware is in house.

2. We still need the prescription for the SRCA.

Quarterly Management Review

The comments from the MODIS technical team from the QMR on September 13 and 14 and the Spacecraft Interface Simulator (SIS) Interface Test Colloquium on September 15 have been compiled into a report dated September 30.

Scan Mirror Surface Roughness

There was a phone message from Tom Kampe on September 28. The surface rms roughness for the mirror is 19 Angstroms for side A and 18 Angstroms for side B. The surface roughness of the afocal telescope mirrors are at 10 Angstroms rms. The intent is to leave the scan mirror in its current condition. Terry Furguson's latest analysis, Q03974, indicates scan mirror okay. Editor's note: Based on our stringent performance requirements and current estimates for scatter, I believe we need to assure our scan mirror, flat, and telescope mirrors have surface properties as close as possible to state of the art.

Radiation Testing Results on MODIS Filters

Russ Clement of the Naval Command Control and Ocean Surveillance Center (NCCOSC) Research and Development (NRad), Test and Evaluation Division, Optical Electronics Branch in San Diego, CA, has prepared a report, dated September, 1994 on radiation testing of MODIS filters for bands 28, 30, 32, and 36. Spectral transmittance properties were investigated following exposure to various gamma dose levels. All radiometric and radiation effects testing were conducted on site at NRaD. Gamma radiation exposures were conducted at the S-Cubed Co-60 range source facility. For three of the samples, the radiometric and radiation effects testing were conducted in May-June 1993. The fourth sample was tested in September, 1994.

Each sample was tested at 77 K before and after nominal doses of 5, 10, and 15 krads of Co-60 radiation. In the absence of observable degradation at 15 krads, one or more exposures up to 150 krads were conducted. The data were collected in the 1.5 micron to 24 micron region.

The report concludes that all of the band pass filters exhibited excellent total dose hardness up to 15 kilorads total dose. The onset of dose degradation for bands 28, 30, and 36 is in the 150 kilorad region, while the onset of dose degradation is between 15 and 50 kilorads for band 32 at an operating temperature of 77 K. Transmission plots are included for the four filters.

My review of the data shows the transmittance reductions varied in the vicinity of the peak of each curve. From the plots is clear that band 32 is the most susceptible to the radiation. Differences in transmission at the peaks vary from near zero to about 9 percent depending on filter, wavelength, and dose. However, reductions in transmission of about one percent appear evident for portions of all the curves near the peaks, even at about the 13 kilorad dose level. It would be helpful to expand the scale for each plot in the vicinity of the peak.

VIRS Filter Problems for Band 2 (1.6 microns)

A phone message was received from Sam Pellicori regarding the apparent problem of instability. The band 2 spectral filter was non-uniform over its area. Transmission results were different for different times, temperatures, or setups. The problem was isolated to a blocking stack having ripples. The ripple moved with physical position and the spectral characteristics. There was an apparent transmission change. The conclusion was that the filter is stable. If the same small area is tested before and after environmental testing, there is no change. The only change came from baking the filter to 300 degrees which is totally unrealistic. SBRC built the long wave (bands 27-31) filters for MODIS using different materials and different substrates. There are no changes due to time or environment for the SBRC MODIS filters. There are no problems comparable to the VIRS band #2. The uniformity of the MODIS filters is good.

Detectors

Bob Martineau presented the detector status. All EM Focal Plane Assemblies (FPAs) have been delivered, integrated, and aligned in the buildup of the EM instrument.

The PF Sensor Chip Assemblies (SCAs) have been completed for the VIS and NIR. All four types of SCA have been delivered to testing. More LWIR and S/MWIR SCAs are being hybridized.

Two PF PC detector arrays are mounted to motherboard.

There are no changes to PFM SNR/NEDT predictions. Band 36 NEDT prediction still slightly out of spec.

The SCA/FPA test set availability has been delayed one month.

PFM SCA delivery is scheduled for 15 October, and PFM FPA delivery is scheduled for January, 1995.

Tilting the Intermediate Stage Window

An e-mail message was sent to Bill Barnes, Tom Pagano, and others on September 27, in reference to Tom's e-mail message regarding not tilting the intermediate stage window for the S/MWIR focal plane. There are concerns that MODIS will not meet the transient response specification. Until we have good test data, we cannot comment on the need to tilt this window.

Systems and Calibration Telecon

The bi-weekly telecon was held on Monday, September 26. Participants included Jim Young, Neil Therrien, Dzung Phan, Ed Knight, Gerry Godden and Mike Roberto.

1. MR - Comments from QMR and splinters are being compiled. Report due out this week.

2. MR - GSFC taking an independent look into tilting the intermediate stage radiative cooler window for the Short/MidWave bands for ghosting reduction. Meeting scheduled for this afternoon at GSFC.

3. EK - Can Jim clarify what he means by stating crosstalk is primarily electrical? MR - I believe Jim would consider charge diffusion, etc. within the detector as electrical.

4. EK - The reflective bands error budget is in memo 93-0868-139. Is there a CDRL or PL number?

5. EK - How are the windows in the dedicated MODIS calibration facility (DMCF) being considered for calibration? JY - The spherical integrating source calibration will involve the DMCF window.

6. EK - How does positioning of the intermediate filter assembly affect EFL errors? NT - The EFL change will be accounted for during integration. The rotational and posiitonal tolerances are large for this filter. However, they will discuss this with Al Roberts. This filter will be positioned so it does not focus directly on the final image plane. JY - The filter does need to be near the intermediate focal plane. However, it will be put as much as possible out of focus without vignetting. It would not seem appropriate to image scratches and digs on the focal plane. Dimensions for the intermediate focal plane filters are four times those at the final focal plane.

7. EK - Talked with geolocation people. An uncertainty in the sample time of four microseconds is not a problem.

Was there any optical properties testing of the black paint on the mainframe? How black is it in the thermal bands? What about scatter? Response by JY. The paint is Aeroglaze Z306. NASA generated data on it at GSFC in the Thematic Mapper days. There are no problems in blackness between 0.4 and 15 microns. It is nominally a diffuse material.

8. GG - Terry Ferguson thought some mainframe interior areas should be roughened up with micro-balloons. Snow blowing of optical surfaces might contaminate these interior areas of the mainframe by generating particulates on the black surface where the snow inadvertently strikes the mainframe. MR note: There might also be a problem trying to clean the mainframe.

9. GG? - There will be characterization tests of the PF detectors in November. We would like to get crosstalk values we could use. JY - It certainly would be appropriate. GG - Will there be any distinguishing between track and scan?

10. EK - For the charts at the QMR of crosstalk in the CLAM and SAM. Was this sender or receiver crosstalk?

11. NT - Spurious signals in the LWIR. The status is still open. The telescope is on. Plan to fire up the focal plane today.

12. EK - How is the six zone intermediate assembly modeled in MSAP. NT? It is certainly modeled for transmission. EK wants to compare 7 zone with 6 zone. What percentage of the SD/SDSM drawings are complete? Eric Johnson would know.

13. EK - What is new on the move? JY does not think they know when it is likely to be. There are a lot of details to be taken into account.

14. GG - Is Jim aware of the scatterometry lab at El Segundo? JY- Yes it is a good source of getting Bi-directional Transmittance Distribution Functions (BTDFs) off optics. Tom Kampe has come up with a paper on the ZnSe window. Bill Holtzer has strongly recommended that they make BTDF measurements on representative samples as soon as possible. There is a related SPIE paper, volume 253, page 203, by Lane Brod and Eniack?

15. GG - Harvey Shack parameters for scan mirror sides A and B. One side specular, other side particulate contaminated? One side had a high slope, the other side a high intercept. JY - The model covers only a certain range of angles.

16. GG - Who is the person to talk to for estimate of the impact of tilting the intermediate stage window? JY - Start with Tom Kampe. GG - Are the coatings on the windows different? Is element #5 closest to the cooler plano. Tom Kampe to answer. Editors note: We have the prescriptions for the optics at GSFC and can answer related questions here.

17. NT mentioned they will be taking telescope data today.

18. JY mentioned he is trying to come up with radiometry equations from scene to detector. Same as point source at detector going out. Coming up with the same results either way. Equations indicate reciprocity.

Spare Electronics Parts

An informal review of several GSFC programs has shown several different approaches in terms of providing for spare electronic parts for instruments. I believe one good approach, which balances initial cost against possible later cost and schedule problems, is one which was mentioned by Jose Florez. There are one or more spare unpopulated printed circuit boards for each unique board. When ordering a printed circuit board, the incremental cost of each additional board ordered is only a few percent of the cost of the first board. There should be enough spare electronic components on hand to populate the spare board if necessary. For cases where there are several identical electronic boards, it is a good idea to have a few spare boards and associated spare components. Survey results were provided to Ken Anderson in revision 1 of a memo dated September 29.

CDRL 301 MODIS System Specification

The review of this document is in a telemail message dated September 28. The review is mentioned here because it is of general interest to science and systems personnel.

Mike Roberto

October 3, 1994

AGENDA

MODIS Science Team Meeting

Oct. 12 - 14, 1994, at College Park Holiday Inn

Tuesday, Oct. 11

8:30 - 5:00 Calibration Working Group Meeting in the Baltimore Room

Wednesday, Oct. 12:

8:00 Registration (at Ballroom A & B)
8:30 Welcome & MODIS Overview/Meeting Goals ———— V. Salomonson
8:45 Headquarters Perspective ———— G. Asrar, D. Wickland/R. Frouin
9:30 EOS Project Science Report———— M. King
10:00 BREAK
10:15 EOSDIS: Status Report ——H.K. Ramapriyan, S. Wharton, B. Barkstrom
11:00 SDST Status Report ———— E. Masuoka, A. Fleig
12:00 LUNCH
1:00 Project Report———— R. Weber, T. Pagano
1:30 MCST Calibration Update: Spurious Light Effects ———— B. Guenther
2:30 Global Imager (GLI) Overview ———— T. Nakajima
2:50 SPOT VEGN Instrument Overview ———— G. Saint
3:15 BREAK
3:30 Atmosphere Science Presentation:
Cloud Mask Discussion ———— led by P. Menzel & B. Baum
4:00 Land Science Presentation:
Vegetation Indices in the EOS Era ———— A. Huete
4:30 Ocean Science Presentations:
Ocean Productivity ———— W. Esaias, M. Abbott

Thursday, Oct. 13:

9:00 - 5:00 Discipline Group Meetings
- Atmosphere Group meets in the Maryland B Room
- Calibration Group meets in the ??? Room
- Land Group meets in the Maryland A Room
- Oceans Group meets in the Terrapin Room

6:00 - 9:30 Social & Banquet, with guest speaker Dr. Albert Bartlett

Friday, Oct. 14:

8:30 MAST Status Report ———— D. Herring, M. Heney
9:00 MCST Status Report ———— B. Guenther
9:30 EOS Instrument & Interdisciplinary Investigator Comments: ———— TBD
CERES Instrument Update ———— B. Baum
Coastal Environments (15 min.) ———— O. Huh
11:00 BREAK
11:15 Calibration Summary Report———— P. Slater
11:45 Discipline Groups' Summary Reports———— C. Justice, M. King, W. Esaias
(20 minutes each)
12:45 Action Items and Closing Remarks ———— V. Salomonson
1:00 ADJOURN MEETING

Sept. 26, 1994

Objectives for Discipline Group Sessions

- Discuss ATBD reviews and revisions
- Discuss preparations for delivery of beta algorithms
- Discuss ancillary data sets